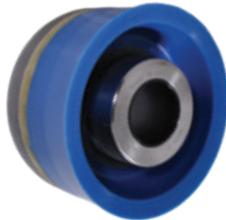


Fluid End Expendables



White Lightning Bonded Piston

The White Lightning™ Bonded Piston is manufactured from a highly engineered elastomeric compound that provides high resistance to water, oil, and synthetic based drilling fluids. The compound provides superior resistance to tear, abrasion, and extrusion and is capable of operating in fluid temperatures up to 230°F (110°C).



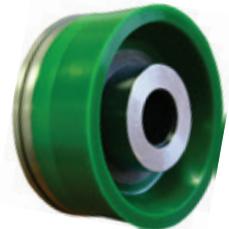
Blue Lightning Piston

Designed for operating in all drilling environments, the Blue Lightning™ Piston is a super premium bonded polyurethane piston. It is manufactured from an engineered elastomeric compound that delivers excellent resistance to tear, abrasion and extrusion while maintaining high mechanical properties. The Blue Lightning piston is capable of operating in fluid temperatures up to 200°F (93°C).



Slip Seal Bullitt Piston

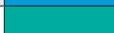
Built to deliver an economical solution for harsh drilling environments, the Slip Seal Bullitt™ Piston is a multi-durometer, solid bonded urethane piston. The design of the piston promises ease of assembly when loading into the liner due to the smooth engagement of the piston into the liner bore. It offers increased resistance to synthetic and oil based drilling fluids and is capable of operating in fluid temperatures of up to 225°F (107°C).



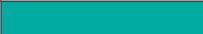
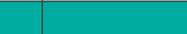
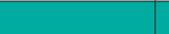
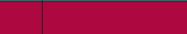
Green Duo Piston

The Green Duo Piston is a bonded dual durometer piston that is highly resistant to abrasion and tear. The bonded construction resists extrusion under pressure and restricts movement to reduce the build-up of heat. Green Duo pistons are recommended for systems with oil or synthetic based mud. It is also recommended for water based muds when weights are 11 lb/gal or over. As in all urethane pistons, the backflush requirement is recommended at 14 gal/min or greater for each piston.

Piston applications

Excellent		Good	
Very good		Poor/not recommended	

Features	Blue Lightning	Bonded White Lightning	Green Duo	Slip Seal Bullitt
Abrasion resistance				
Tear resistance				
Resistance oil				
Chemical resistance				
Resistance to synthetic oil				
Temperature resistance				
Extrusion resistance				
Use in oil-based muds				
Use in synthetic-based muds				
Use in water-based mud >#10				
Use in water-based mud <#10				

Features	Blue Lightning	Bonded White Lightning	Green Duo	Slip Seal Bullitt
Use in water-based mud >#11				
Use in water-based mud <#11				
Use in clear water				
Use in salt water				
Use in low solids				
Use in moderate solids				
Use in high solids				
Linear wear characteristics				
Use in ceramic liners				
Maximum temperature (Flow Line) (°F)	200	230	180	225